d.) Remarks

Turning first to Item 5 of the instant Action, applicant will attempt to comply with this request by addressing each numbered item in the Action in serial order.

Item 1 is self-evident. Item 2, the response to arguments and discussion in applicant's previous amendment, are noted. Applicant will attempt herein to more clearly set forth the distinctions of the invention over the references by using more specific language in the claims. Item 4 requires no response, and Item 5 is noted above.

Items 6 and 7 state a rejection under §112 that cites several different phrases used in the claims and requests applicant to locate antecedents in the specification and drawings. In serial order, they are (application citations in italics):

a) **"determine the existence and number and angles of vertices in a line which could be drawn between said points."** Note page 29, lines 3-6: *"The hand drawn entry is analyzed geometrically. The software goes through and looks for recognizable vertices that exceed an angular threshold. The number of vertices that are detected is stored for later use."* Note also page 38, lines 14-24: *"As shown in Figures 10 and 11, a vertex determination is made if the slice angle (current deltangle) exceeds the current threshold angle, AND the current deltangle value is less than the previous deltangle value. This latter factor indicates that a region of maximum curvature has been detected. Note that the slice of Figure 10 has an angle of 58°, and the subsequent slice (Figure 11) has a*

slice angle of 5°, indicating that the software steps have iterated along the stroke past the region of maximum angle, which is at (or close to) the midpoint of the slice of Figure 10. Therefore, the software places the vertex at the midpoint of the slice of Figure 10. The process continues until all slices of the stroke have been processed, and all vertices determined." These citations provide antecedent support that is more than adequate.

b) **"color rules to determine agglomeration of said entries as a single entity."** Note page 28, line 18 to page 29, line *"It can be determined that only intersecting hand drawn entries or hand drawn entries in close proximity that are of the exact same color can be added together or joined to comprise a composite recognizable object. Furthermore, color can be a determining factor for agglomeration. For instance, if a stroke is added to an existing object where the stroke and object are the same color, agglomeration can take place. However, if the added stroke is not the same color as the existing object, agglomeration will not take place if it has been set up that only the agglomeration of same color hand drawn entries can occur."* This is an explicit explanation of the color rule regarding agglomeration. Note the questioned phrase was in the claim as originally filed.

c) **"excluding identification of shapes that do not conform to said set of rules regarding maximum proximate distance to said another graphic object."** Note page 5, lines 5-18: *"Agglomeration is the ability to draw an object and THEN LATER at any time in the future, draw another stroke (or strokes) that can be recognized as an "additional stroke(s)" added to the original stroke. The*

added strokes are analyzed together with the original strokes to redefine the identity of the original object. The agglomeration process is subject to a proximity default gap consideration. That is, the distance from the "additional stroke" (or strokes) to the original object (stroke) determines whether this software considers the second stroke(s) as an additional stroke to be added to the original stroke for the purpose of modifying its recognition as an object... One practical default gap for this purpose could be 12 pixels (approximately 1/8 inch on a standard VGA monitor)."

Note also page 31-32, lines 23-4: *"Default gap: A user-defined distance (measured in any unit a user desires, i.e., pixels, millimeters, inches, picas, etc.) that comprises the maximum distance that can exist as a gap in a hand drawn object's defining stroke or strokes. This default gap is also the maximum permissible distance that any hand drawn entry can be from any previously existing hand drawn entry in order for a newly hand drawn entry to be considered part of a previously existing hand drawn entry."* The proximity default gap consideration was expressed in original claim 27 as "maximum proximate distance" and is thus fully supported by the original disclosure.

d) **"reiterating said slice step."** Note page 33, line 13 to page 34, line 6: *"**Slice:** The slice is the selection of points which is used to measure the angle of a drawn stroke and determine if there is any deviation. A slice is a "theoretical" line constructed point-to-point between three adjacent points (each defined by the pixel threshold), which are required to analyze a deviation in a stroke. The distance between the first point and the second point must exceed the "pixel*

threshold", defined above. Likewise for the distance between the second point and the third point. These three points comprise a slice. The length is analyzed from point to point accounting for individual displacements of each point along the way, which may not create a perfectly straight "theoretical" line. With regard to Figure 4, the three points shown are not in a straight line, which is typically the case with a real hand drawn entry. So the total length of the slice is comprised of the distance between point one and point two added to the distance between point two and point three. Note that a slice is a transitory collection of points which are used to measure an angle of deviation. In contrast, "segments" continue to exist in the software as part of a hand drawn object.

The routine for identifying each slice is depicted in Figure 5. Note that the three points selected to comprise each slice are spaced apart by a distance greater than the pixel threshold."

Note also page 38, line 22-23: *"The process continues until all slices of the stroke have been processed, and all vertices determined."* Thus the recitation of a slice step and its reiteration is clearly supported.

Item 8 questions the relative meanings of "substantially orthogonal", etc. in the claims. Note page 73, lines 18-20: *"The algorithm looks for the difference between the end-to-end segment angles first - it measures the angle between segments and looks for angles that are greater than 65 and less than 110. This is the initial test."* The person having ordinary skill knows that a rectangle is comprised ideally of four right angles, and the range of 65°-110° is a fair definition of 'substantially orthogonal' as well as 'substantially non-orthogonal'.

Items 9-11 state an objection to the phrase "maximum total reduction" in claim 96. This claim has been canceled.

Item 12 states an objection to claims 38 and 47. It is believed that claim 38 is fully supported, as indicated in the reply to item 7(d) above. Claim 47 was previously canceled and not presented for examination.

Items 13 and 14 state a rejection under §102 of claims 1, 2, 4-7, 9-15, 24, 29-43, and 48-49 over Yamakawa, previously cited. Items 15-17 state a rejection of most other claims based on Yamakawa, Capps, and Meeks. Since many claims have been amended herein, it would not be appropriate to argue the old rejections per se. Rather, these references and the distinctions of the claims thereover will be discussed in the order of claim presentation.

Claim 1 has been amended to add a more explicit recitation of the Wide Pen test, including constructing a minimal rectangle about a hand drawn entry, placing an invisible trial object of defined pixel width lines in the minimal rectangle, counting the points of the hand drawn entry that coincide with the wide line, and declaring an identification if the number of points is greater than a predetermined threshold. This recitation is supported in the specification, inter alia, on pages 40-41. Claims 15 and 17, which were similar in scope, have been canceled.

The Wide Pen Test recitations of the previous claims stand rejected under §103 over the combination of Yamakawa and Capps. Capps does generate a bounding rectangle, as shown in Figure 14 of the reference. However, this bounding rectangle is not used in any way for stroke analysis. Rather, the

bounding box is used to locate the sequential frames of a brief animation that graphically demonstrates the erasure of an object from the display. There is no basis for assuming that the Capps bounding box bears any relationship to stroke analysis.

The current rejection cites Capps col. 10, lines 6-21 as a showing of adaptively altering the width of the pen stroke in the Wide Pen test. Capps does not have any such showing of a Wide Pen test, nor of adaptively altering a pen stroke for analysis and identification purposes. The reference undertakes to reduce the number of line segments by removing segments that are shorter than a predetermined LENGTH threshold, and then eliminating corners that are less than a predetermined ANGLE to reduce the figure substantially and then count the remaining corners. There is no disclosure regarding pen WIDTH, nor of determining the coincidence of points of a drawn input to a machine-rendered regular figure drawn in a wide pen line.

Capps col. 11, lines 15-26 is cited as a showing of analysis by determining coincidence of the drawn input with an identifiable geometric shape (the Wide Pen test). This rejection is completely unsupported by the facts. The Capps citation relates to an analysis technique in which the drawn input is processed to find corner points by first drawing an imaginary straight line between the first and last points of the input, and then finding the farthest point on the drawn input from the imaginary line. If the farthest point is more than a predetermined distance (MaxDev) from the imaginary line, it is defined as a corner point. The process is reiterated until a set of processed points is developed and none of the actual points

on the input stroke are farther that the predetermined distance from the imaginary line.

It is significant to note that Capps never describes inscribing a trial object in the bounding rectangle, nor determining the coincidence of the points of the hand drawn entry with the lines of the trial object to determine if a minimum coincidence level has been reached. The imaginary lines drawn by Capps in his bounding rectangle are used only to calculate the most distant point therefrom to designate as a corner, NOT to determine coincidence with a known trial object. There is not a sufficient factual foundation in Capps for rejecting the Wide Pen Test feature, and claim 1 should be allowed.

Applicant feels compelled to state for the record that other recited features of claim 1 are not met by the prior art citations, as asserted in the rejection. For example, Yamakawa col. 7, lines 27-51 is cited as a teaching of the step of determining the existence and number and angles of vertices in a line drawn between the points of the hand drawn entry. This passage describes how Yamakawa divides any input character into 32 equal segments (regardless of size or shape) and places a dot at the end of each segment. It then connects the dots, and determines the angles of the two lines extending from each dot. <u>These dots are arbitrarily located according to the divide-by-32 process, and are not vertices.</u> Indeed, the chance that one of the dots actually is located at a vertex is extremely remote.

In further techniques, Yamakawa describes that each input stroke is broken down into component vectors, and that virtual transition strokes may also be

reduced to component vectors, after which the vector information is reduced to fuzzy vectors. Here it is important to note that the number of component vectors is limited in the Yamakawa system. As noted in col. 5, lines 25-30, " In the system employing the fuzzy vector, since the total number of the "component vectors" is the smallest number of units representing the trajectory of handwriting in forming a handwritten character, a number greater than the number of strokes of the handwritten character is required for extracting information of the trajectory of handwriting therefrom." Note also col. 5, lines 39-43: "That is, the number of the component vectors is not changed by the length of the total strokes, but the number of the component vectors per one stroke is univocally (sic) determined by the number of strokes." Thus the longer the stroke (or combination of strokes), the greater the spacing of points in Yamakawa and the less accurate is the analysis.

It must be emphasized that the use of transition strokes, the use of vectors, the limitations on the number of vectors (comparable to, in the present invention, the number of data points or slice calculations), or the limitation of vector numbers based on the number of strokes in a character, are all concepts that are completely antithetical to the techniques described and claimed in the present invention. There is no actual determination of vertices or angular trends in Yamakawa; instead, the reference resorts to 'fuzzy vectors', which are best understood as broad categorizations of the angular relationships between the adjacent limited number of component vectors of Yamakawa. The fuzzy vectors are integers that describe the component vector changes only according to which Cartesian quadrant the change is pointing toward, and thus provides no more angular

resolution than ±90°. This technique cannot determine the presence or location of a vertex. Rather, the fuzzy vector information is compared to a dictionary of fuzzy vector patterns that correlate with known characters.

Applicant has abundantly supported the claim language regarding determining the existence, number and angles of the vertices of a drawn entry, particularly how a vertex is measured and found among all the points of a hand drawn entry.

Claims 2, 4-8 depend from claim 1 and further refine that patentable recitation, and should also be allowable.

Claim 9 recites the invention in a mode similar to claim 1, but instead of the Wide Pen Test it specifies a plurality of hand drawn entries of various colors, and that the set of rules for identification includes rules for agglomerating entries of the same color. Strangely, no reference or combination of references has been applied to claim 9 in the Second Action. Indeed, none of the citations deals with color in the handling of hand drawn entries, and it is clear that claim 9 is allowable over the art.

Claim 10 recites the invention in a mode similar to claims 1 and 9, and also adds the step of using arrow logics to establish attributes of the identified shape. This claim stands rejected over Yamakawa only, and this reference makes no showing of arrows in any use or function that is similar to arrow logics. Thus claim 10 is prima facie allowable over the reference. Perhaps the rejection should have made reference to Capps Figures 3A-3E, which are cited in rejecting claims 23 and 95. Capps Figures 3A-3E are cited to show the step of drawing at least one

arrow from an attribute shown in an info window to at least one identified shape outside said info window. These figures make no such showing. Rather, Figures 3A-3E depict a scrub (erasure) gesture drawn over a sentence of text, or one side of a graphic object, or the vertex of a graphic object, or a caret gesture made between two characters of text, or an open space gesture made between two lines of text (col. 3, lines 28-38). Although the graphic object depicted is an arrow, this arrow has absolutely no function (programming or otherwise) other than passively receiving the scrub gesture. It does not convey any attribute from an info window to an identified shape outside the info window, as set forth in the definition of arrow logics on page 13 of the specification. Therefore claim 10 should be allowed.

Claim 11 also employs the same general format as the previous independent claims, and more specifically recites the step of creating an info window for at least one of said identified shapes, said info window enabling setting and altering attributes for said at least one identified shape. This claim stands rejected over Yamakawa under §102, although no specific citation in the reference is applied to the claim. There being no info window disclosure in this (or any other) reference, it is asserted that claim 11 should be allowed.

Claims 12-14, 16, and 18-22 all depend from claim 1, further refining that patentable recitation, and thus should also be allowable. Note also that claim 18 explicates one way for reiterating the Wide Pen Test when a coincidence comparison is unsuccessful, by substituting a further trial object in the bounding rectangle. Claim 19 explicates another way for reiterating the Wide Pen Test by

increasing the width of the wide pen stroke when a coincidence comparison is unsuccessful. None of these techniques are disclosed in the prior art, and these claims should also be allowed.

Claim 23 depends from claim 11, and further specifies the step of drawing at least one arrow from an attribute shown in an info window to at least one identified shape outside said info window. Capps Figs. 3A-3E is cited in particular in rejecting this claim. These figures make no showing regarding the claimed invention. Claim 11 recites inter alia an info window, and claim 23 adds the use of an arrow to convey an attribute shown in an info window to an identified shape outside the info window. Figs. 3A-3E of the reference portray the steps in drawing and recognizing a scrub gesture and applying its function to an underlying onscreen object. There is no teaching of the use of an info window for any purpose, nor is there any teaching of drawing an arrow from an info window to an identified onscreen object to convey an attribute from the info window to the object. Thus it is clear that the claim defines the invention over the reference and should be allowed.

Claims 24 and 25 depend from allowable claim 1, and further add the step of determining the angular orientation of the hand drawn entry with respect to a reference orientation, and (claim 25) thereafter excluding identification of shapes that do not conform to the rules regarding angular orientation. The Yamakawa reference is cited against claim 24, particularly Figs. 11-14 and col. 7-8 of the reference. These figures depict the coarse angular resolution of Yamakawa due to the use of fuzzy vectors which reduce lines to membership values in Cartesian

quadrants. Note col. 8, line 38 et seq.: *"Through the above described procedures, four membership grades μ_0, μ_1, μ_2, and μ_3 are output from one component vector and all of the patterns of the membership grades μ_0, μ_1, μ_2, and μ_3 are stored in memory.*

Step 7

Taking up, as the objects, the dictionary's characters with the same number of strokes as the handwritten input character, the membership grades of the handwritten input character obtained in step 6 are matched with membership grades of all of the dictionary's characters to thereby calculate similarity measure..." Clearly Yamakawa derives the membership grades as a numerical derivative of the vector, and then stores the membership grades of various characters and matches them to make an identification. This numerical matching technique has no relevance to the task of actually determining the angular orientation of the hand drawn entry, and claim 24 should be allowed.

It is noted for the record that claim 25 stands rejected under §112, but there is no rejection of the claim over the prior art. Given the literal meaning of §102 ("A person shall be entitled to a patent unless...") and the fact that the rejection under §112 has been overcome by this amendment, it is asserted that claim 25 is factually, procedurally, and lawfully allowable and should be issued.

Claim 26 depends from allowable claim 1, and further refines that patentable recitation by adding the step of assessing the proximity of the entry to another graphic object to exclude identification of shapes that do not meet rules regarding maximum proximate distance. Capps Figure 4 is cited against this

feature. As noted previously, Capps does determine the proximity of a hand drawn entry to a previous onscreen graphic, but it is not for the purpose of identification of the onscreen object (by way of exclusion of shapes). Rather, Capps determines sufficient proximity in order to apply the gesture (scrub or erase) to the proximate object. This proximity does not aid in recognizing the scrub gesture, nor in identifying the previous onscreen graphic. Thus the reference is not carrying out the claimed process, and claim 26 should be allowed as well.

Claim 29 follows the format of other independent claims and notably includes the step of identifying a portion of the hand drawn entry drawn more slowly than other portions of the hand drawn entry. It stands rejected only over Yamakawa, which is not applied explicitly to the claim. The reference makes no disclosure regarding changing the speed at which a portion of an entry is identified, and claim 29 is clearly allowable over the reference.

Claims 30-37 depend from claim 29 and further refine that patentable recitation and are thus also allowable. In addition, claim 30 recites the step of determining the existence of a vertex in the portion of said hand drawn entry, and calculating the vertex angle. The Yamakawa citation does not teach or suggest this step; rather, it assigns spaced dots along the drawn line and uses them as markers for segments. Claim 32 adds that if a vertex angle in the portion is orthogonal, there is an increased potential for identifying a rectilinear shape. These analysis steps are not taught nor suggested in the prior art, and these claims should be allowed.

Claim 33 depends from claim 30 and states that if a vertex angle in the portion of the hand drawn entry is non-orthogonal, there is increased potential for exclusion of all rectilinear shapes. Claim 34 depends from claim 30 and adds that if a pair of vertex angles in the portion of the hand drawn entry are substantially orthogonal, proximate, and opposite, there is increased potential for identification of a folder shape. Yamakawa Figure 9 cannot in any way be construed to teach these concepts. These drawn entry analysis steps are not taught nor suggested in the prior art, and these claims should be allowed.

Claim 35 also depends from claim 30 and recites one of the golden clue techniques: a vertex identified and measured in a first-drawn portion of a hand entry will be more accurately drawn that the latter portions. Thus making such an identification may yield an increased potential for identification of a particular shape, or exclusion of particular shapes. Yamakawa Fig. 1(b) or Fig. 4 are completely irrelevant to this identification technique, and claim 35 should be allowed. Claims 36 and 37 depend from claim 35 and further add the limitations discussed with reference to claims 32 and 33, and should likewise be allowable.

Yamakawa uses a vector process that does not process substantially all the points of the drawn entry. Rather, it *a priori* limits drastically the number of points to process in accordance with the number of strokes to approximately 32, which is typically thousands of times less than the number of points processed in the claimed invention. Moreover, Yamakawa does not process accumulated angle information to determine curvature of the line, nor does it determine the presence of vertices, particularly when the drawn line does not form a clear vertex (abrupt

turning point). The rejection points to col. 7, lines 25-67 of Yamakawa, which details how the absolute angles of the component vectors are subsequently reduced to fuzzy vectors. As noted above, the fuzzy vectors are low order integers that represent the grossest approximation of the directions of the component vectors from which they are derived. These fuzzy vectors are then compared to a dictionary of symbols; they are NOT further processed to identify vertices, determine angular trend, or any other process that is employed in the present invention. Only the slice processing techniques of the present invention can accomplish these tasks, and then use the results to identify the drawn figure with a very high degree of accuracy.

Claims 38-41 set forth this process, and, finding no counterpart in the prior art, define patentable subject matter. Note claim 38 has been substantially amended to set forth the details of identifying the three points of each slice and measuring the angle constructed therebetween. Note that the minimum pixel distance between slice points may process a great number of points, and will process more points in a longer hand drawn entry. In contrast, Yamakawa sets a fixed number of segments to break the drawing into, no matter how long it may be, and the longer the drawing the worse will be the resolution of a fixed number of segments.

In the instant invention, the stroke of a hand drawn input is broken down into slices of sequences of three serial points that are spaced apart greater than a minimum distance, and each slice is analyzed to determine its angle. <u>There is no limitation to the number of slices that are processed</u>. The sequential slice angles

are analyzed to determine the presence or absence of an angular trend in the stroke, and to determine the presence or absence of a vertex.

Claims 48-50 depend from allowable claim 1 and are thus likewise patentable. Regarding the rejection of claim 50, applicant finds no citation in Capps "where numeric information can be entered into the pen-based computer system." Nor is there any discussion of magic number values in either reference.

Claim 95 depends from claim 11 and adds an arrow logic limitation that is the converse of claim 23; that is, the arrow is drawn to an attribute in an info window from an identified shape outside the info window. The comments regarding claim 23 are equally applicable here, and it is asserted that claim 95 clearly defines the invention over the Capps disclosure regarding arrows, as well as any combination that could be made with Yamakawa.

The claims have been substantially amended to particularly point out the manifest distinctions of the invention over the cited art, and many claims have been canceled. It is asserted that all claims now presented are allowable, and the application is in condition to be passed to issue. Action toward that end is earnestly solicited.

Respectfully Submitted,

Harris Zimmerman, Esq.
Registration No. 16, 437
Attorney for Applicant
Law Offices of Harris Zimmerman
1330 Broadway, Suite 710
Oakland, California 94612
(510) 465-0828

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